FRIWO®

POWERUNLIMITED

CATALOGUE

Products

- **RoHS:**
  Restriction of the use of certain Hazardous Substances
  FRIWO completely abandoned the use of environmentally unfriendly substances; in this transition, we have for example implemented lead free soldering. Major investments in comprehensive laboratory and analysis equipment here at FRIWO will help us to secure such high quality standards.

- **WEEE:**
  Waste Electrical and Electronic Equipment
  FRIWO products already bear today all the markings that will be required by international laws for an integrated recycling process tomorrow.

All devices are tested for operational safety in our own accredited testing centres and leave our factories as "zero-fault products". FRIWO power supply and charger platforms are approved in Europe, USA, Canada, Japan and Australia without further testing.

Leading position in power supplies

Continuous further development of our high-quality products, their innovative design, and our technical expertise have made CEAG AG/FRIWO Group a reliable and experienced industry partner worldwide. Highly qualified, flexible employees guarantee the quick development cycles demanded by today's market.

The market- and customer-oriented design of the individual product platforms, the flexible adjustment of production capacities and the optimum organisation of the sales result in a successful positioning on the global power supply market. Over 930 million power supplies and chargers sold in 33 years are a clear evidence of the Group's high level of expertise and innovative ability.

CEAG AG/FRIWO Group

FRIWO is the wholly owned subsidiary of CEAG AG. Listed in the Prime Standard, CEAG AG is the holding company of the FRIWO Group, with its registered office in Bad Homburg and headquarters in Ostbevern/Westphalia. As such, it is the world's leading provider – through the FRIWO brand – of charging units for mobile phones. The major shareholder of CEAG AG is DELTON AG with almost 77 percent of the share capital.

Asia, Shanghai

Asia, Tokyo

Asia, Seoul

North America,
Colorado Springs

South America, São Paulo

Switchmode Power Supply

Switchmode Technology

Switchmode power supply units are particularly suited for feeding portable devices. Their low weight and extremely compact form mean they can be just as advantageously combined with all other types of applications.

An additional increase in attractiveness results from the wide-range input so that the power supply units can be operated all over the world using mains voltages from 100 to 240 V AC and 50 to 60 Hz. This makes worldwide use possible and means a drastic reduction in the logistics expenses on the part of our customers.

Such solutions can either be realised as desktop units with worldwide standardised IEC sockets (our DT series) or as plug-in power supply units with exchangeable mains plug adapters (our MPP series). Details regarding these products can be found on the following pages.

First, here is some important technical information:

Primary Switched Power Supply Units

In such a power supply unit, the mains voltage is first rectified and smoothed. After that, it is switched at high frequencies and transferred via a converter transformer. The required low voltage is then generated within another rectification and smoothing step. A high-precision direct voltage with very low tolerances can be provided by means of an additional stabilisation circuit.

Beyond these advantages of the compact design and wide-range input, the high efficiency is of decisive importance: at an achievable 90 percent, the losses due to emission of heat are minimized. The requirements for very low stand-by power consumption (stand-by power) can only be met using this technology.

FRIWO offers an extensive range of standard devices with excellent features. At a corresponding volume, further variants for all kinds of special requirements can be developed. In the process, the application considerably determines the design:

- In addition to output current and voltage, requirements regarding control stabilisation and ripple of the output voltage, EMC behaviour, efficiency, etc. influence the power supply unit design.
- Specific requirements regarding size and shape have an effect on the component expense and thus the costs of the unit.
- Various circuit topologies can be used according to the requirements.
- Designs as plug-in power supply units, desktop devices, or even as modules (= open frame) for all special applications can also be realised.

Safety Regulations, Protection Classes, and Connection Types

Power supply units can be found in a number of applications. For this reason, the specific safety regulations of the devices being powered, depending on the regulation of the testing authorities of the respective countries, such as the UL (Underwriter Laboratories), VDE (Association of German Electrical Engineers), etc., must be particularly observed.

The EMC conformity according to EN 61000-6-X, under consideration of system perturbations according to EN 61000-3-2 should be observed for power supply units independent of the switching concept.

When selecting the housing, the ambient conditions, for example in moist environments, must be considered. For general applications, the type of protection according to EN 60529-IP20 (Operation in Dry Rooms – Protection Against the Penetration of Solid Foreign Body) suffices. According to application, power supply units are designed in accordance with the respective applicable regulations. Due to the safe galvanic separation, all devices fulfil the low-voltage guideline and provide a safety extra-low voltage (SELV).

Switchmode Power Supply

MPP 30 Medical

Conforms to IEC 60601-1

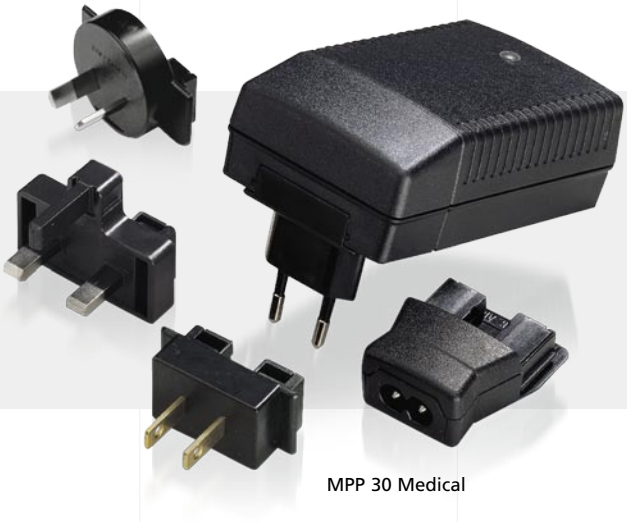
30 Watts

Applications

- Inhalers
- Patient monitors
- Patient lifts
- Measuring instruments
- Laboratory equipment

Characteristics

- Universal input 100 to 240 V AC
- Interchangeable primary adapters
- Constant voltage, current limited
- Green LED indicator
- Low leakage current ≤ 10 µA
- Low standby power ≤ 0.5 Watts
- Continuously short circuit proof



MPP 30 Medical

Technical data

Input voltage	100 to 240 V AC
Input current	700 mA
Frequency	50 to 60 Hz
Efficiency	80% typ. at full load
EMC	Conforms to EN 55011, EN 55014, EN 55022/B, FCC 47 part 15, EN 61000-3-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11
Output voltage tolerance	± 5%

Environmental specification

Operating temp.	0 to 40° C at maximum load
Storage temp.	-10 to 70° C
Humidity	5% to 95% non condensing
Input transient susceptibility	Complies with IEC 61000 requirements

Safety specification

Standards	Fulfils Class II SELV for the following applications: IEC 60601-1, UL 2601, VDE, CE label, fulfils medical application class B/BF/CF

Reliability specification

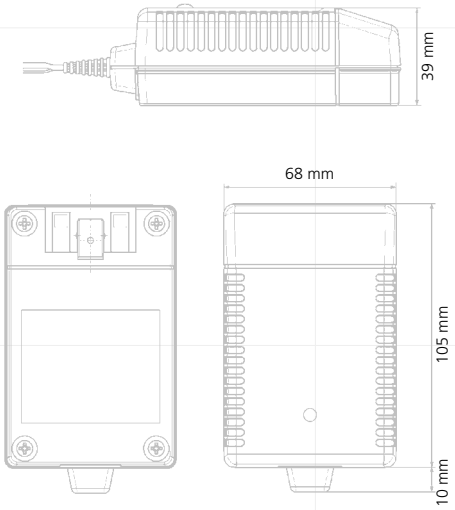
MTBF calculation	200,000 hours at maximum load levels and an ambient temperature of 25° C (in correspondence with MIL-HDBK-217)

Mechanical specification

Weight approx.	255 g
Plug connector	AC input: FRIWO exchangeable mains plug system: EURO, UK, USA/Japan, Australia, IEC DC output: Universal output plug system

Market leading

Medical power supplies	100 to 240 V input voltage without earthing, leakage current ≤ 10 µA



MPP 30 Medical

Output data			Worldwide
Voltage	Current	Ripple Volt.	Order No.
5 V	**4000 mA**	**75 mV pp**	**1883264**
6 V	**3600 mA**	**75 mV pp**	**1883265**
7.5 V	**3300 mA**	**75 mV pp**	**1883266**
9 V	**3000 mA**	**90 mV pp**	**1883267**
12 V	**2500 mA**	**100 mV pp**	**1883268**
15 V	**2000 mA**	**100 mV pp**	**1883269**
18 V	**1660 mA**	**120 mV pp**	**1883270**
24 V	**1250 mA**	**120 mV pp**	**1883271**